

NASA's Swift Learns a New Trick, Spots a Snacking Black Hole

Using NASA's Swift observatory, scientists discovered a black hole in a distant galaxy repeatedly nibbling on a Sun-like star, a pair collectively called Swift J0230.

When a star strays too close to a monster black hole, gravitational forces create intense tides that break the star apart into a stream of gas. These destructive episodes are called tidal disruption events. Astronomers see them as flares of multiwavelength light created when the debris collides with a disk of material already orbiting the black hole.

Recently, astronomers have investigated what they call partial or repeating tidal disruptions. During these events, an orbiting star passes close to a black hole, bulges outward, sheds material, but survives. The process repeats until the star loses too much gas and finally breaks apart. On June 22, 2022, Swift's X-Ray Telescope (XRT) captured Swift J0230 for the first time when it lit up a galaxy around 500 million light-years away. XRT observed nine additional outbursts from the same location roughly every few weeks.

Astronomers propose Swift J0230 is a repeating tidal disruption of a Sun-like star orbiting a black hole with over 200,000 times the Sun's mass. They estimate the star loses around three Earth masses of material on each pass. This system provides a bridge between other types of suspected repeating disruptions and allowed scientists to model how interactions between different star types and black hole sizes affect what we observe. Swift J0230's discovery was possible thanks to a new, automated search of XRT observations called the Swift X-ray Transient Detector.



In this illustration, a supermassive black hole pulls a stream of gas off a star that passes too close.

Feature: <https://www.nasa.gov/feature/goddard/2023/nasa-s-swift-learns-a-new-trick-spots-a-snacking-black-hole>

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<https://www.nature.com/articles/s41550-023-02073-y>